REMARKS/ARGUMENTS

Applicants respectfully request further examination and reconsideration in view of the above amendments and arguments set forth fully below. Claims 1 through 75 and 94 through 109, were previously pending in the instant application. Within the Office Action, the Drawings were objected to for not showing a limitation shown in newly recited claims 3, 50, and 95. The specification was objected to for not showing newly recited limitations relating to the plurality of inlet channels and the plurality of exhaust channels. Claim 70 was objected to based on an informality. Claims 1 through 75 and 94 through 109 were rejected under 35 U.S.C. 112 first paragraph. Claims 1 through 75 and 94 through 109 were rejected under 35 U.S.C. 112 second paragraph as being indefinite. Claims 1 through 75 and 94 through 109 have been rejected. Claims 70 is amended. By way of the above amendments and arguments below, Claims 1 through 75 and 94 through 109 overcome the rejections and objections. Accordingly, Claims 1 through 75 and 94 through 109 are now pending in this application.

Objection to Drawings:

The drawings filed on October 5, 2007 are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims.

The examiner states that the following features are not show in the drawings; the micro-scaled regions being wider than the heat source and defining an overhang of the heat source in an embodiment of the fluid-cooled device including a plurality of parallel micro-scaled regions with a plurality of inlet and exhaust channels interleaved therebetween.

The Fig. 1A and Fig. 2 defines the overhang "W_{OH}" as the distance between the heat source 101 and either the micro-scaled regions 104 or the heat source 101 and the heat-spreader 103. Support for the overhang of both the overhang of the heat source, heat spreader, or the overhang of both are clearly shown in both Fig. 1A, and Fig. 2. Specifically the figures both show the W_{OH} (width overhang) as extending over the heat source 101. Further, support for an overhang of the spreader and/or micro-scaled region is found in the within the specification on page 4, lines 22-26 and page 8, lines 5-8. The specification specifically states; "...the higher thermal conductivity spreader region is wider laterally than the heat source and lies between the micro-scaled region and the heat source and that the micro-scaled overhangs with respect to the heat source (on either side of the heat source) ...." Accordingly, both the specification and the

drawings support the limitation of a spreader region overhanging the heat source, a micro-scaled region overhanging the heat source, or both a spreader region and micro-scaled region overhanging the heat source. For at least these reasons, the drawings support the claim elements of Claim 3, 50, and 95.

The Examiner states that the figures do not support "the spreader region interposed between the heat source and the micro-scaled regions with a plurality of inlet and exhaust channels interleaved therebetween as newly recited as newly recited in claims 25 and 72." The Applicant traverses this rejection. The spreader region element is shown in 103-Fig. 1A, 203-Fig. 2, and 302-Fig. 3A and 3B. A plurality of micro-scaled regions 303 are shown in Fig. 3A. The inlets to the micro-scaled regions are shown as the plurality of inlet channels 304' and the plurality of outlet channels 305' that are coupled to the channel 304 and 305. As shown in Fig. 3A, a fluid entering the channel 304 follows the path to the plurality of inlet channels 304' interleaved between the micro-scaled regions 303. The fluid path passes through the plurality of micro-scaled regions 303 to the plurality of exhaust channels 305' and out the channel 305. Accordingly, Fig. 3A shows a plurality of inlet and exhaust channels interleaved between the micro-scaled regions. Fig. 1A clearly shows the spreader region 103 interposed between the heat source 101 and the micro-scaled region 104. Accordingly, the drawing, Fig. 1A and 3A show the cited limitation for claims 25 and 72 and therefore the objection to the drawings should be held in abeyance.

Specification Objections:

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. The Examiner states that there appears to be no antecedent basis in the claims for the newly recited limitation relating to the plurality of inlet channels and to the plurality of exhaust channels. Specifically, the word "exhaust" fails to appear in the specification. One skilled in to art of designing heat exchanges using fluids would consider exhaust channels to be the channels from which fluid exits a device and the outlet channels to be the channels from which fluid exits a device. Accordingly, one skilled in the art would consider and outlet channels and exhaust channels synonymous with each other. Therefore, the used in the specification of term "outlet channels" provides support for the claim element of "exhaust channels." Accordingly, the objection to the specification should be held in abeyance.

Claim Objections:

Withing the Office Action, Claims 70 is objected on the grounds of informalities. Claim 70 is amended to overcome the objection.

Rejections Under 35 U.S.C. § 112 (first paragraph)

Within the Office Action, Claims 1 through 75 and 94 through 109 are rejected under 35 U.S.C. 112, second paragraph, as failing to comply with the written description requirement. Specifically each base claim 1, 48, and 94 as amended now recites that the direction of flow in adjacent micro-scaled regions is in substantially opposite directions. The Examiner states that the originally filed disclosure fails to clearly describe, illustrate, or otherwise unequivocally disclose suggest that the direction of flow in adjacent micro-scaled regions is in substantially opposite directions. The Applicants traverses this objection for the reasons below.

Figure 3A shows a fluid path entering the device 300 at the channel 304. The fluid flows down the channel 304 to a plurality of inlet channels 304' interleaved between the miro-scaled regions 303. The fluid is shown exiting the micro-scaled regions 303 into a plurality of exhaust channels 305' coupled to the channel 305. One skilled in the art of micro-scaled regions would appreciate that the micro-scaled regions would be configured for fluid to flow through the micro-scaled region along the entire interface with the inlet channel 304'. For the fluid to flow from the inlet channel 304' through the micro-scaled region 303 to the exhaust channel 305', the fluid must flow through the micro-scaled region 303 and into the exhaust channel 305' interleaved between the micro-scaled regions. This flow is in a direction that is substantially perpendicular to 304'. Thus, as Fig. 3A shows, the fluid for the top micro-scaled region 303 must flow along the inlet channel 304', along the micro-scaled region, and flow towards the bottom of the page to reach the exhaust channel 305', which is shown interleaved between the micro-scaled regions 303. The adjacent micro-scaled region 303, in the configuration shown, has fluid flowing along the opposite side of the micro-scaled region along opposite side through a different interleaved inlet channel 304'. To reach the exhaust channel 305', the fluid must flow towards the top of the page through the micro-scaled region. Accordingly, the fluid in the second micro-scaled region 303 from the top, flows perpendicular to the inlet channel 304' on the bottom side in a substantially opposite direction than the flow through the top and adjacent micro-scaled region. This relationship of fluid flow repeats for each adjacent micro-scaled region as shown progressing

down the page of Fig. 3A. Accordingly, Fig. 3A unequivocally discloses shows a structure where the fluid flow through adjacent micro-scaled regions is in substantially opposite directions. Therefore, the limitations of a fluid flow in adjacent micro-scaled regions in substantially opposite directions found in claims 1, 48, and 94 are supported by the specification. Accordingly, the 35 U.S.C. 112 first paragraph enablement rejection for claims 1, 48, and 94 should be held in abeyance.

Within the Office Action, the base claims 1 and 48, are rejected on the grounds the originally filed specification fails to show, describe, or suggest a spreader region having one sided coupled to a heat source and another side coupled to the plurality of micro-scaled regions. The Applicants traverse this rejection. Fig. 3B, a representative cross section of one embodiment of heat-exchanger device, shows a spreader 302-Fig. 3B, positioned over a heat source 301-Fig. 3B and coupled to a plurality of micro-scaled regions 303-Fig. 3B and Fig. 3A. The structure is described within the specification on pages 16 and 17 of the originally filed specification. Specifically, page 16 , lines 5-6 state "The means for spreading heat is coupled to the heat source." Further it is stated "The means for micro-scaled fluid flow is coupled to the means for spreading heat." (page 16, lines 11-12) The description of Fig. 3B, page 16 lines 2-23 describes a device which shows a spreader 302 between the heat source 301 and the micro-scaled region 303. Accordingly, the specification provides support for a spreader region having one side positioned on and coupled to a heat source and the other side coupled to a plurality of micro-scaled regions as shown in 303-Fig. 3A. Therefore, there is support in the specification and the corresponding rejection based on 35 U.S.C. 112 first paragraph should be held in abeyance.

Within the Office Action, the claims 3, 50, and 95 are rejected under 35 U.S.C. 112 first paragraph for lacking a micro-scaled regions 303 (mis-identified as 304 within the Office Action) as being wider than the heat source and thus defining an overhang. As argued above under the "Objection to the Drawings", the specification provided is enabling in regards to the limitations of a micro-scaled regions being wider than the heat source. Accordingly, the 35 U.S.C. 112 first paragraph rejection of claims 3, 50, and 95 should be held in abeyance.

Within the Office Action, the claims 25 and 72 are rejected under 35 U.S.C. 112 first paragraph for lacking support for "the spreader region interposed between the heat source and the micro-scaled regions with a plurality of inlet and exhaust channels interleaved therebetween as newly recited as newly recited in claims 25 and 72." The element of the spreader region is shown in 103-Fig. 1A and 203-Fig. 2. A plurality of micro-scaled regions are shown in 303-Fig.

3A. The inlet channels to the micro-scaled regions are shown as 304' where the fluid passes through the plurality of micro-scaled region 303-Fig. 3A and exits the plurality of exhaust channels 305'-Fig. 3A. Accordingly, the specification shows the spreader region interposed between the heat source and the micro-scaled regions with a plurality of inlet and exhaust channels interleaved therebetween. Therefore, the 35 U.S.C. 112 first paragraph rejection of claims 25 and 72 should be held in abeyance.

Rejections Under 35 U.S.C. § 112 (second paragraph)

Claim 1-75 and 94-109 are rejected under 35 U.S.C. 112 second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regards as the invention. Specifically the Examiner states the "wherein the direction of fluid flow ... is in substantially opposite directions" is indefinite. The Applicants traverse this rejection based on the same reasons argued above. As argued above, the structure disclosed in figure 3A specifically shows a structure where the fluid flow within a micro-scaled region is in substantially opposite directions. Accordingly, Claims 1-75 and 94-109 are compliant with 35 U.S.C. 112 second paragraph and the rejection should be held in abeyance.

Within the Office Action, claims 30-36 are rejected under 35 U.S.C. 112 second paragraph as being duplicative of the limitations added of a the plurality of inlet and exhaust channels cited in claim 1. The Applicants traverses this rejections. The manifolding layer provides a cover or top that can overlie the micro-scaled region and the plurality of inlet channels or outlet channels to provide an enclosed fluid path through which the inlet channels and exhaust channels traverse. (page 15, lines 11-22) The manifold is coupled with the plurality of inlet channels paths and exhaust channels. Accordingly, the limitations with respect to a manifold are not duplicative of the new limitations in claim 1.

The finial Office Action is incomplete in that no prior art is provided as grounds of rejection.

Under MPEP 2143.03, even indefinite limitations must be considered.

> "A claim limitation which is considered indefinite cannot be disregarded. If a claim is subject to more than one interpretation, at least one of which would render the claim unpatentable over the prior art, the examiner should

reject the claim as indefinite under 35 U.S.C. 112, second paragraph (see MPEP § 706.03(d)) and should reject the claim over the prior art based on the interpretation of the claim that renders the prior art applicable."

For the reasons argued above, the claims are not indefinite under paragraph one and paragraph two of 35 U.S.C 112. But even if considered indefinite for arguments sake, the examiner should provide an interpretation of the claims, over a prior art reference. Because no prior art has been cited against the cited claims the Office Action is incomplete. Accordingly, the final rejection should be held in abeyance.

For the reasons given above, the Applicants respectfully submit that the Claims 1 through 75 and 94 through 109 are in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, the Examiner is encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

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